

What is Claimed is:

1. A multi-functional power source for producing an external mechanical power, comprising:

a generator, which is adapted for outputting induced electric power, comprising:

5 a generator housing defining a receiving chamber;

a rotor comprising a magnetic element coaxially and rotatably disposed within said receiving chamber and defining a magnetic cavity within said magnetic element, and

a stator comprising a coil assembly coaxially disposed within said magnetic cavity; and

10 an engine arrangement, comprising:

an engine casing;

an internal combustion engine disposed in said engine casing:

an elongated crankshaft having an driven portion extended from said internal combustion engine and a driving portion extended out of said engine casing to couple
15 with said rotor in such a manner that, when said internal combustion engine produces a mechanical power to drive said rotor to rotate through said crankshaft, said magnetic element is coaxially rotated to induce with said coil assembly for producing said induced electric power; and

an output axle, having an output end, integrally extended from said crankshaft
20 to a position out of said generator housing such that when said crankshaft drives said output axle to rotate, said output end of said output axle is adapted for producing said external mechanical power even when said generator is producing said induced electric power.

2. The multi-functional power source, as recited in claim 1, wherein said output axle is integrally and coaxially extended from said driving portion of said crankshaft while said output end of said output axle is coaxially extended through said magnetic cavity to an exterior of said generator housing.

5 3. The multi-functional power source, as recited in claim 2, wherein said engine assembly further comprises a second output axle, having a second output end, integrally and coaxially extended from said driven portion of said crankshaft while said second output end of said second output axle is coaxially extended to an exterior of said engine casing at a direction opposite to said output end of said output axle.

10 4. The multi-functional power source, as recited in claim 1, wherein said rotor further comprises a tubular sleeve rotatably disposed in said receiving chamber, a flywheel coaxially and rotatably mounted to an inner circumferential sidewall of said tubular sleeve, and a flywheel starting gear securely engaged with said flywheel to coaxially couple with said driving portion of the crankshaft, wherein said magnetic
15 element is coaxially attached to said inner circumferential sidewall of said tubular sleeve in such a manner that when said flywheel starting gear is driven to rotate via said crankshaft, said flywheel is driven to rotate to drive said magnetic element to rotate via said tubular sleeve so as to induce said magnetic element with said coil assembly for producing said induced electric power.

20 5. The multi-functional power source, as recited in claim 2, wherein said rotor further comprises a tubular sleeve rotatably disposed in said receiving chamber, a flywheel coaxially and rotatably mounted to an inner circumferential sidewall of said tubular sleeve, and a flywheel starting gear securely engaged with said flywheel to coaxially couple with said driving portion of the crankshaft, wherein said magnetic
25 element is coaxially attached to said inner circumferential sidewall of said tubular sleeve in such a manner that when said flywheel starting gear is driven to rotate via said crankshaft, said flywheel is driven to rotate to drive said magnetic element to rotate via said tubular sleeve so as to induce said magnetic element with said coil assembly for producing said induced electric power.

30 6. The multi-functional power source, as recited in claim 3, wherein said rotor further comprises a tubular sleeve rotatably disposed in said receiving chamber, a flywheel coaxially and rotatably mounted to an inner circumferential sidewall of said

tubular sleeve, and a flywheel starting gear securely engaged with said flywheel to coaxially couple with said driving portion of the crankshaft, wherein said magnetic element is coaxially attached to said inner circumferential sidewall of said tubular sleeve in such a manner that when said flywheel starting gear is driven to rotate via said crankshaft, said flywheel is driven to rotate to drive said magnetic element to rotate via
5 said tubular sleeve so as to induce said magnetic element with said coil assembly for producing said induced electric power.

7. The multi-functional power source, as recited in claim 4, wherein said generator further comprises an air ventilation arrangement which has a plurality of ventilating through holes evenly formed on said tubular sleeve to radially project with
10 respect to said magnetic cavity and comprises a plurality of fan wings radially provided at a front side of said flywheel to respectively align with said ventilating through holes in such a manner that when said flywheel is driven to rotate, said fan wings are adapted for ventilating an air within said tubular sleeve through said ventilating through holes.

8. The multi-functional power source, as recited in claim 5, wherein said generator further comprises an air ventilation arrangement which has a plurality of ventilating through holes evenly formed on said tubular sleeve to radially project with
15 respect to said magnetic cavity and comprises a plurality of fan wings radially provided at a front side of said flywheel to respectively align with said ventilating through holes in such a manner that when said flywheel is driven to rotate, said fan wings are adapted for ventilating an air within said tubular sleeve through said ventilating through holes.
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9. The multi-functional power source, as recited in claim 6, wherein said generator further comprises an air ventilation arrangement which has a plurality of ventilating through holes evenly formed on said tubular sleeve to radially project with
25 respect to said magnetic cavity and comprises a plurality of fan wings radially provided at a front side of said flywheel to respectively align with said ventilating through holes in such a manner that when said flywheel is driven to rotate, said fan wings are adapted for ventilating an air within said tubular sleeve through said ventilating through holes.

10. The multi-functional power source, as recited in claim 2, wherein said coil assembly comprises a plurality of wire coils radially positioned within said magnetic
30 cavity of the magnetic element to form a coil disc, having a central stator hole, securely

supported within said magnetic cavity, wherein said output axle is coaxially extended through said central stator hole to said exterior of said generator housing.

11. The multi-functional power source, as recited in claim 6, wherein said coil assembly comprises a plurality of wire coils radially positioned within said magnetic cavity of the magnetic element to form a coil disc, having a central stator hole, securely supported within said magnetic cavity, wherein said output axle is coaxially extended through said central stator hole to said exterior of said generator housing.

12. The multi-functional power source, as recited in claim 8, wherein said coil assembly comprises a plurality of wire coils radially positioned within said magnetic cavity of the magnetic element to form a coil disc, having a central stator hole, securely supported within said magnetic cavity, wherein said output axle is coaxially extended through said central stator hole to said exterior of said generator housing.

13. The multi-functional power source, as recited in claim 9, wherein said coil assembly comprises a plurality of wire coils radially positioned within said magnetic cavity of the magnetic element to form a coil disc, having a central stator hole, securely supported within said magnetic cavity, wherein said output axle is coaxially extended through said central stator hole to said exterior of said generator housing.

14. The multi-functional power source, as recited in claim 6, wherein said magnetic element is a magnet, having a ring shaped, securely affixed to said inner circumferential sidewall of said tubular sleeve to define said magnetic cavity within an inner circumferential side of said magnetic element for creating a magnetic field within said magnetic cavity towards said coil assembly.

15. The multi-functional power source, as recited in claim 8, wherein said magnetic element is a magnet, having a ring shaped, securely affixed to said inner circumferential sidewall of said tubular sleeve to define said magnetic cavity within an inner circumferential side of said magnetic element for creating a magnetic field within said magnetic cavity towards said coil assembly.

16. The multi-functional power source, as recited in claim 13, wherein said magnetic element is a magnet, having a ring shaped, securely affixed to said inner circumferential sidewall of said tubular sleeve to define said magnetic cavity within an

inner circumferential side of said magnetic element for creating a magnetic field within said magnetic cavity towards said coil assembly.

17. The multi-functional power source, as recited in claim 1, wherein said output axle is integrally and coaxially extended from said driven portion of said crankshaft while said output end of said output axle is coaxially extended to an exterior of said engine casing at a direction opposite to said generator.

18. The multi-functional power source, as recited in claim 17, wherein said rotor further comprises a tubular sleeve rotatably disposed in said receiving chamber, a flywheel coaxially and rotatably mounted to an inner circumferential sidewall of said tubular sleeve, and a flywheel starting gear securely engaged with said flywheel to coaxially couple with said driving portion of the crankshaft, wherein said magnetic element is coaxially attached to said inner circumferential sidewall of said tubular sleeve in such a manner that when said flywheel starting gear is driven to rotate via said crankshaft, said flywheel is driven to rotate to drive said magnetic element to rotate via said tubular sleeve so as to induce said magnetic element with said coil assembly for producing said induced electric power.

19. The multi-functional power source, as recited in claim 18, wherein said generator further comprises an air ventilation arrangement which has a plurality of ventilating through holes evenly formed on said tubular sleeve to radially project with respect to said magnetic cavity and comprises a plurality of fan wings radially provided at a front side of said flywheel to respectively align with said ventilating through holes in such a manner that when said flywheel is driven to rotate, said fan wings are adapted for ventilating an air within said tubular sleeve through said ventilating through holes.

20. The multi-functional power source, as recited in claim 17, wherein said coil assembly comprises a plurality of wire coils radially positioned within said magnetic cavity of the magnetic element to form a coil disc securely supported within said magnetic cavity.

21. The multi-functional power source, as recited in claim 19, wherein said coil assembly comprises a plurality of wire coils radially positioned within said magnetic cavity of the magnetic element to form a coil disc securely supported within said magnetic cavity.

22. The multi-functional power source, as recited in claim 18, wherein said magnetic element is a magnet, having a ring shaped, securely affixed to said inner circumferential sidewall of said tubular sleeve to define said magnetic cavity within an inner circumferential side of said magnetic element for creating a magnetic field within
5 said magnetic cavity towards said coil assembly.

23. The multi-functional power source, as recited in claim 21, wherein said magnetic element is a magnet, having a ring shaped, securely affixed to said inner circumferential sidewall of said tubular sleeve to define said magnetic cavity within an inner circumferential side of said magnetic element for creating a magnetic field within
10 said magnetic cavity towards said coil assembly